

# "CUSTOM" VIBRASONIC AMP

p/n 021-5200-000 (120V)

## SERVICE MANUAL



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Fender Musical Instruments Corp.  
7975 North Hayden Road Scottsdale, AZ 85258

**“CUSTOM” VIBRASONIC**  
(This is the model name for warranty claims)

**SERVICE MANUAL**

**NOVEMBER 1995**

**IMPORTANT NOTICE:**

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For warranty repair service, only Fender specified part numbers are to be used. It is recommended they also be used for post-warranty maintenance and repair.

Parts marked with an asterisk (\*) indicate the required use of that specific part. This is necessary for RELIABILITY and SAFETY requirements. **DO NOT USE A SUBSTITUTE!**

A coded naming convention is used in the description of certain parts. The codes and what they mean are as follows:

**CAPACITOR CODES**

CAP AE = Aluminum Electrolytic  
CAP CA = Ceramic Axial  
CAP CD = Ceramic Disk  
CAP MPF = Metalized Polyester Film  
CAP MY = Mylar  
CAP PFF = Polyester Film/Foil

**RESISTOR CODES**

RES CC = Carbon Comp  
RES CF = Carbon Film  
RES FP = Flame Proof  
RES MF = Metal Film  
RES WW = Wire Wound

**HARDWARE CODES**

BLX = Black Oxide  
CR = Chrome Plated  
HWH = Hex Washer Head  
M = Machine Screw  
NI = Nickel Plated  
OHP = Oval Head Phillips  
PB = Particle Board  
PHP = Pan Head Phillips  
PHPS = Pan Head Phillips Sems  
SMA = Sheet Metal "A" Point  
SMB = Sheet Metal "B" Point  
SS = Stainless Steel  
TF = Thread Forming  
ZI = Zinc Plated

# "CUSTOM" VIBRASONIC

## SPECIFICATIONS

<b>Product Release No.:</b>	PR 186 <i>(This is not a model number)</i>	
<b>Part Number:</b>	120V Version :	021-5200-000
<b>Input impedance:</b>	Input 1, both channels	1m $\Omega$
	Input 2, both channels	132k $\Omega$
<b>Power Output:</b>	85 Watts RMS minimum @ 5% THD	
<b>Rated load impedance:</b>	4 $\Omega$	
<b>Speaker Complement:</b>	(1) 15" "Special Design" (p/n 049135)	
<b>Dimensions:</b>	Height: 22"	(55.9 cm)
	Width: 26 5/32"	(66.4 cm)
	Depth: 10 3/8"	(26.4 cm)
<b>Weight:</b>	71 lbs.	(32.3 kg)

*Product specifications are subject to change without notice*

# “CUSTOM” VIBRASONIC

## THEORY OF OPERATION

### STEEL CHANNEL

J1 is the high sensitivity input and J2 is the low sensitivity input. The input is fed to V1A, which provides a gain of about 42. The output from V1A drives the Treble (R7), Mid(R9), and Bass(R7) tone controls, then feeds the Volume control (R10). When engaged, the SWEET switch connects C5 to the wiper of the VOLUME control. This provides a boost in the high frequencies. The “Sweet” feature is most noticeable at lower volume settings. The signal then feeds to V1B, which provides a gain of about 66.

### GUITAR CHANNEL

J3 is the high sensitivity input and J4 is the low sensitivity input. V2A contains the FAT switch which boosts the gain mostly at lower and mid frequencies. V2A drives the tone controls, and the Volume control (R21) feeds V2B. V1B and V2B share the same cathode resistor (R23) and bypass capacitor (C11). The output of the Steel channel (V1B pin 6) sums with the output of the GUITAR channel at V2B pin 6. From that point the signal follows two paths. One to the reverb drive stage (V3). The other through R32 to summing amp V4B.

### REVERB

V3 (12AT7) provides a gain of about 33 to drive the reverb transformer. V4A is the Reverb recovery or sense stage. The Reverb control (R29) determines the amount of reverb signal that is summed with the dry signal at V4B. Via the footswitch, the Reverb can be disabled by grounding the signal at the node between R30 and R74.

### VIBRATO

V5A is a low frequency oscillator. The *Speed* control (R56) varies the oscillation frequency. V5B is the Neon Lamp driver. The lamp flashes faster or slower based on the position of the Speed control (R56). The brightness of the neon bulb is sensed by the LDR (Light Dependent Resistor). The LDR connects to the *Intensity* control (R64) which varies the amount of low frequency modulation applied to the input of the Phase Inverter(V6).

### POWER AMPLIFIER

The output from V4B feeds the Phase Inverter(V6), which is a classic style split-load type, used without feedback. The output tubes (5881/6L6WGC) are arranged in a push-pull configuration that will produce 85 watts minimum into a four(4)  $\Omega$  load at 5% THD.

## PARTS LIST

### PRINTED CIRCUIT BOARD ASSEMBLY

<u>QTY</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>REFERENCE DESIGNATION</u>
1	049266	PCB ASSY CUSTOM VIBRASONIC ALLV	(STUFFED)
3	037805	CABLE RIBBON 6CKT 2-1/4"	
1	031069	CAP AE RDL 10uF 100v 20%	C37
5	028465	CAP AE RDL 22uF 25V 20%	C6 C11 C14 C27 C28
1	036954	CAP AE RDL 22uF 63V 20%	C36
3	024819	CAP AE AX 22uF 500v 20%	C32 C33 C34
1	031040	CAP AE RDL 100uF 100V 20%	C35
2	013638	CAP AE AX 200uF 285V 20%	C30 C31
2	025979	CAPCD 50pF 1KV 10%	C5 C10
1	031780	CAP SLVR MICA 150PF 300V	C7
1	007029	CAPCD 220pF 1KV 10%	C38
1	020917	CAPCD 250pF 1KV 10%	C2
1	020842	CAPCD 500pF 1KV 10%	C13
1	047065	CAP PFF RDL .0015uF 100V	C16
1	037666	CAP PFF .001 uF 400v 10%	C20
2	024823	CAP MPF RDL .01uF 400V 10%	C25 C26

**“CUSTOM” VIBRASONIC  
PRINTED CIRCUIT BOARD ASSEMBLY (CONT)**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
2	024833	CAP MPF RDL .022UF 400V 10%	C12 C24
2	024835	CAP MPF RDL .022UF 630V 10%	C9 C40
1	024845	CAP MPF RDL .047UF 400V 10%	C4
1	024846	CAP MPF RDL .047UF 630V	C8
1	024853	CAP MPF RDL .1UF 250V 10%	C21
2	024854	CAP MPF RDL .1UF 400V 10%	C3 C19
2	024855	CAP MPF RDL .1UF 630V 10%	C22 C23
2	037596	CONTROL SNAPIN 1M 30A	R10 R21 (VOLUME)
1	037601	CONTROL SNAPIN 3M 30C	R56 (SPEED)
1	028421	CONTROL 100Ω D FOJ SCREW ADJ	R69 (HUM BALANCE)
1	017502	CONTROL 10K B SCREW ADJ	R71 (BIAS ADJUST)
2	037598	CONTROL SNAPIN 10K 10A	R9 R20 (MID)
1	037602	CONTROL SNAPIN 50K 30C	R64 (INTENSITY)
1	037600	CONTROL SNAPIN 100K B	R29 (REVERB)
2	037599	CONTROL SNAPIN 250K 10A	R8 R19 (BASS)
2	037597	CONTROL SNAPIN 250K 30A	R7 R18 (TREBLE)
1	064089	DIODE 1N4003 200PRV 1AMP	CR5
4	026730	DIODE 1N4006/1N5062 800PRV 1A	CR1 CR2 CR3 CR4
15	026000	FASTON TAB .187	CP17 THRU CP31
16	025802	FASTON TAB .250	CP1 THRU CP16
3	027413	HEADER .1" CTR 6 CIRCUIT	P1 P2 P3
4	037117	JACK PHONE PCB MONO CLOSED CKT	J1 J2 J3 J4 (INPUTS)
1	025933	JACK PHONO DUAL PC MTG	J8 (REVERB PAN CONN.)
1	037836	OPTOISOLATOR ASSY 65 TWIN	OP1
1	037628	PCB 65 TWIN REVERB	(RAW PCB)
1	024937	RES CF ¼W 10Ω 5%	R73
2	024964	RES CF 1/4W 820Ω 5%	R23 R41
4	024969	RES CF 1/4W 1.5K 5%	R5 R16 R26 R27 R46-49
1	024972	RES CF 1/4W 2.7K 5%	R60
1	024981	RES CF 1/4W 10K 5%	R75
5	024995	RES CF 1/4W 68K 5%	R1 R2 R12 R13 R77
1	024996	RES CF 1/4W 82K 5%	R74
1	029613	RES CF 1/4W 91k 5%	R55
2	024997	RES CF 1/4W 100k 5%	R6 R17
4	025059	RES CF 1/4W 220K 5%	R31 R35 R44 R45
1	025060	RES CF 1/4W 270k 5%	R76
1	025063	RES CF 1/4W 390k 5%	R30
7	025069	RES CF 1/4W 1 1M 5%	R3 R14 R24 R37 R38 R57 R58
1	025074	RES CF 1/4W 1.8M 5%	R59
1	025077	RES CF 1/4W 3.3M 5%	R32
1	025084	RES CF 1/4W 10M 5%	R63
1	028861	RES CF 1/2W 27K 5%	R70
1	037665	RES CF ½W 27K 5%	R72
8	025116	RES CF 1/2W 100K 5%	R4 R11 R15 R22 R28 R33 R61 R62
3	025117	RES CF 1/2W 220K 5%	R54 R65 R66
3	037664	RES FP 1W 1K 5%	R67
1	027347	RES CF 1W 2.2K 5%	R25
1	036469	RES FP 1W 4.7K 5%	R68
1	027350	RES CF 1W 22K 5%	R36
1	027352	RES CF 1W 91K 5%	R43
1	027353	RES CF 1W 100K 5%	R42
2	037835	SWITCH SLIDE SPST	S4 S5
1	028503	THERMISTOR 10Ω 5A C60-11	THI

**CHASSIS ASSEMBLY**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	049516	CHS ASSY 120V CUST. VIBRASONIC	(COMPLETE CHASSIS)
1	037582	CHS 65 TWIN REVERB	(RAW)
7	018022	BUSHING SNAP 5/16 X 17/32 BLK	
1	026038	BUSHING STRAIN RELIEF	(100V/120V AC CORD)

**“CUSTOM” VIBRASONIC  
CHASSIS ASSEMBLY (CONT)**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	010401	BUSHING STRAIN RELIEF	(220V/240V AC CORD)
1	026541	CABLE ASSY PWR W/.50 TAB 120V	(POWER CABLE 120V ONLY)
1	048463	CABLE ASSY PWR .250 TAB 100V	(POWER CABLE 100V ONLY)
1	033331	CABLE ASSY PWR 220/240V	(POWER CABLE 230V ONLY)
1	038602	CABLE ASSY PWR AUST .250 TAB	(PWR CABLE AUSTRALIA 240V)
1	040993	CABLE ASSY PWR 5A U.K. .250 TAB	(P CABLE UNITED KINGDOM 240V)
1	036486	CHOKE FILTER	L1
1	022491	CLAMP CABLE SCRW MNT	
1	028421	CONTROL 100Ω SCREW ADJ.	R69 (HUM BALANCE)
1	017502	CONTROL 10K 20% SCREW ADJ.	R71 (BIAS ADJUST)
1	037854	COVER CAPACITOR	
1	013737	FUSE TD 1-1/4X1/4 250V 4A	F1 (100V/120V)
1	013115	FUSE TD 20MMX5MM 250V 2A	F1 (220V/240V)
1	036702	FUSEHOLDER 3AG FINGER GRIP	XF1 (100V/120V)
1	036703	FUSEHOLDER 5MM FINGER GRIP	XF1 (220V/240V)
1	021550	JACK PHONE TIP SHUNT 12A	J5 (SPEAKER OUT)
1	021956	JACK PHONE OPEN CIRCUIT 11	J6 (EXT. SPEAKER OUT)
1	013043	JACK PHONE STEREO 12B	J7 (FOOTSWITCH)
11	024604	KNOB BLACK W/ WHITE STAMP 14000	
1	027887	LUG SOLDER 3/8	(HUM BAL. WIPER GND)
5	016352	NUT HEX 3/8-32X3/32 TK NI	(HUM BIAS, OUTPUT, FTSW)
8	022004	NUT KEPS #8-32	(XFMR MOUNTING)
1	049115	PANEL FRONT VIBRASONIC	
1	049116	PANEL REAR VIBRASONIC	
1	032219	PILOT LIGHT COLLAR	
1	021642	PILOT LIGHT #47	
1	021741	PILOT LIGHT HOLDER	
1	031625	PILOT LIGHT NUT	
1	036595	PILOT LIGHT LENS JEWEL RED	
4	024969	RES CF 1/4W 1.5K 5%	R46-49 (@PWR TUBE SOCKETS)
4	021402	RES CC 1W 470Ω 10%	R50-53 (@ PWR TUBE SOCKETS)
4	027979	SCREW M 4-40X1/4 PHP NI	(SLIDE SWITCHES)
14	028937	SCREW TF 6-32X5/8 PHP ZI	(MAIN PCB) (CAP PCB)
1	9904101560	SCREW 6X3/8 HI-LO PHP BLX	(RCA JACK)
4	016473	SCREW MA 8-32X1/2 PHP ZI	(OUTPUT XFMR)
1	032806	SCREW MA TF 6-32X1/4 BLX	(REAR PANEL)
30	029913	SCREW TF 6-32X3/16 PHP ZI	(TUBE SOCKETS, CHOKE, REVERB, XFMR)
10	025936	STAND OFF PCB PUSH ON	
5	037783	STAND OFF PCB PUSH ON 1/4L	
1	036570	SWITCH TOGGLE DPST	S1 (POWER OFF/ON)
1	037039	SWITCH TOGGLE SPST	S3 (STANDBY)
1	037612	XFMR OUTPUT 65 TWIN	T2
1	049181	TRANSFORMER POWER (EXPORT)	T1 (100V/110/120/220/230/240V)
1	037610	TRANSFORMER POWER 120V	T1 (DOMESTIC)
1	037099	TRANSFORMER REVERB	T3
4	020424	TUBE RING UNIVERSAL (277H-2)	(POWER TUBES)
4	023580	TUBE SOCKET 8 PIN	
6	041267	TUBE SOCKET 9 PIN PORCEL W/SHIELD	
2	023531	TUBE VACUUM 12AT7	V3 V6
4	039214	TUBE VACUUM 5881/6L6WGC	V7 V8 V9 V10
4	013341	TUBE VACU 7025/12AX7WA RUSSIAN	V1 V2 V4 V5
3	022293	WASHER FLAT .473 X .750	(SWITCHES POWER, STANDBY)
3	031153	WASHER FLAT 3/8X.614 NI	(JACKS SPEAKER, FTSW)
4	9904300100	WASHER LCK INTL 3/8X.618	(JACKS SPEAKER, FTSW, HUM BALANCE)

**CABINET ASSEMBLY**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	049109	CABINET ASSY CUSTOM VIBRASONIC	
1	049109030	BACK ASSY LOWER VIBRASONIC	(BACKBOARD)
1	049109020	BACK ASSY UPPER VIBRASONIC	(BACKBOARD)

**“CUSTOM” VIBRASONIC  
CABINET ASSEMBLY (CONT)**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	038566	CABLE ASSY SPKR RT ANG 13-1/2"	(SPEAKER CABLE)
1	025722	CABLE REVERB 1100MM	
4	026566	CORNER 2 HOLE W/TAB NI	
4	024653	GLIDE CAB 1.24X.335 NI	(STEEL ONLY)
4	019275	GLIDE-INSERT CUSHION 1.27 DIA	(RUBBER ONLY)
1	049109010	GRILLE BAFFLE ASSY VIBRASONIC	(COMPLETE GRILLE)
REF	037788	GRILLE CLOTH BLACK/SILVER	
1	049094	HANDLE MOLDED BACK	
2	024828	LEG AMP TILT 16"	
1	047600	NAMEPLATE LOGO BLACK	
2	021998	NUT LOCK 10-32 W/ NYLON INSERT	(@TILT BACK LEGS)
4	064162	NUT-T 8-32X1/2 STR 3 PRNG BLX	(HANDLE MOUNTING)
8	021972	NUT T 10-32X3/4 STR 3 PRNG BLX	(SPEAKER MOUNTING)
1	031849	REVERB BAG	
1	064063	REVERB UNIT 4 SPRING 4AB3C1B	(PAN)
4	037210	SCREW SMA 2X 3/8 OHPNI	(NAMEPLATE MOUNT)
4	037247	SCREW M 8-32X1 OHP NI	(HANDLE MOUNTING)
4	022236	SCREW M 8-32X3-1/4 OHP NI	(CHASSIS MOUNTING)
8	037543	SCREW SMAB 8X3/4 OHP NI	(CORNER MOUNTING)
4	026625	SCREW WOOD 8X1" FLAT HEAD	(GLIDE MOUNTING)
2	031344	SCREW SMA #6X1 OHP NI	(@ LEG STOP)
8	026577	SCREW M 10-32X1 PHP BLX	(SPEAKER MOUNT)
2	022277	SCREW M 10-32X1-1/2 OHP NI	(TILT BACK LEGS)
8	037952	SCREW SMA #6X1 OHP NI	(BACKBOARD MOUNT)
7	029828	SCREW PB #8X33/4 PHP ZI	(REVERB/REAR CHASSIS MOUNT)
1	049135	SPEAKER 15" 4Ω CAST FRAME	
2	024752	STRAP CHASSIS 4-1/2" NI	(CHASSIS MOUNTING)
8	037215	WASHER C'SINK #6 NI	(BACKBOARD MOUNT)
2	022285	WASHER SP LOCK 1/4X9/16 NI	(TILT BACK LEGS)
6	022319	WASHER FLAT 1/4X9/16 NI	(TILT BACK LEGS)
2	024646	WASHER LEG STOP TN	(TILT BACK LEGS)
11	029527	WASHER FINISH #8X5/8 BLX	(GRILLE MOUNTING)
2	022327	WASHER FLAT #8X7/16 NI	(REVERB MOUNTING)

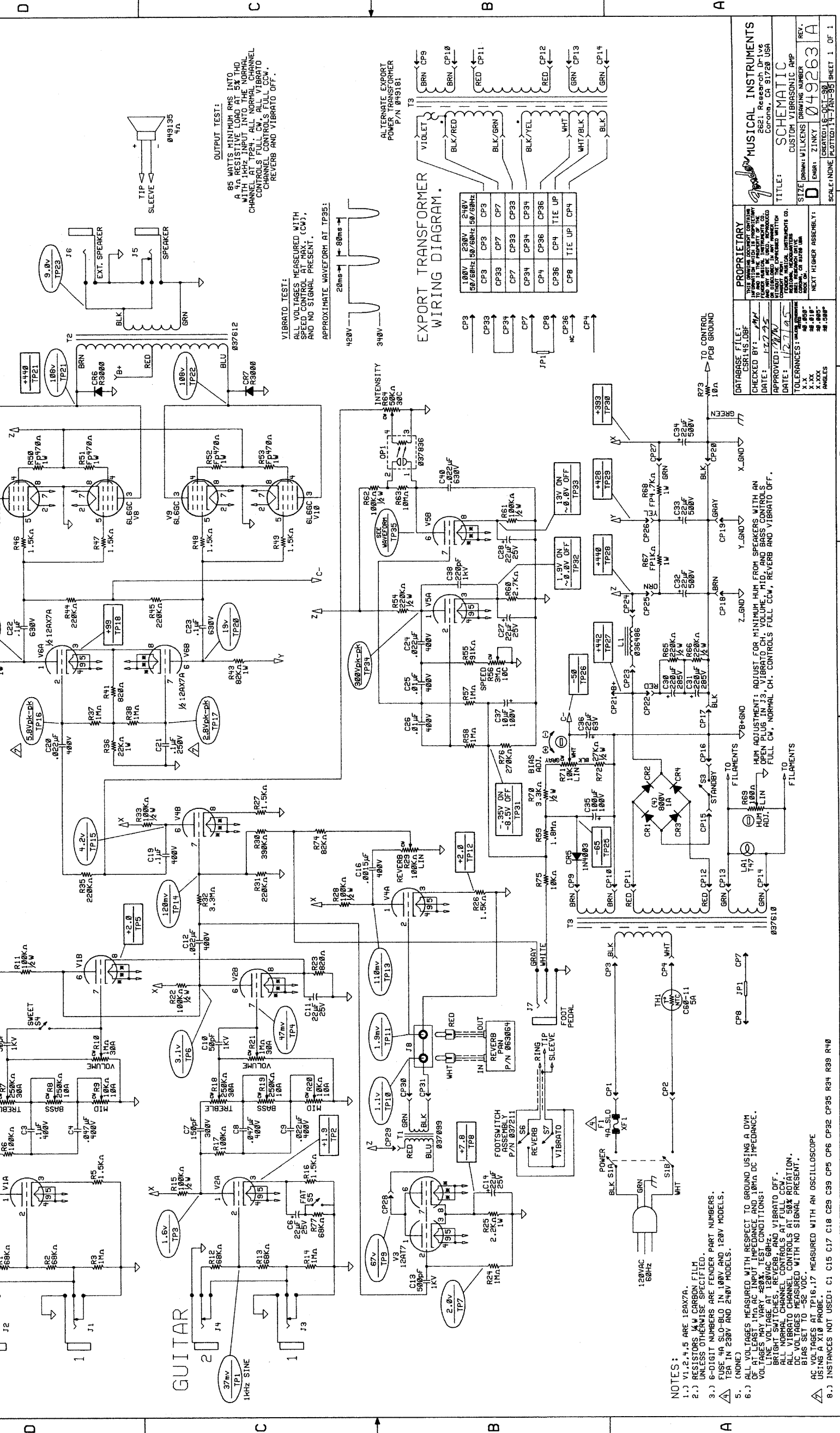
**FOOTSWITCH ASSEMBLY**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	037211	FOOTSWITCH VIRBRO//65 TWIN	(COMPLETE FOOTSWITCH)
1	021691	BUSHING SR.500X.100X7/16 BLK	(STRAIN RELIEF)
1	022665	COVER CUP DUAL FTSW ASSY	(BLACK, SNAP ON)
1	024638	CUP FOOTSWITCH DUAL	(HOUSING 2 BUTTON)
1	016063	DECAL FOOTSWITCH VIBRATO +R	(VIBRO/REVERB)
1	013172	PLUG PHONE 3 CONDUCTOR 238 RA	
2	024042	SWITCH SPST PUSHBUTTON	S6 S7 (FOOTSWITCHES)
2	022293	WASHER FLAT .473X.750 NI	
REF	023861	WIRE BLACK 2 CONDUCTOR	(SHIELD OVER 1 COND)
REF	023945	WIRE BRAIDED SHIELD	(INTERNAL GRND JUMPER)

**MISCELLANEOUS**

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>	<b>REFERENCE DESIGNATION</b>
1	049515	MANUAL OWNERS CUSTOM VIBRASONIC	
1	049264	SCHEM REDU W/SVC DIA VIBRASONIC	

REV. DESCRIPTION		DATE	APPROVED
1	A RELEASED CSR14	19-JAN-85	MON



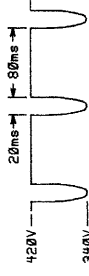
STEEL

GUITAR

EXPORT TRANSFORMER WIRING DIAGRAM.

OUTPUT TEST:  
85 WATTS MINIMUM RMS INTO  
A 4Ω RESISTIVE LOAD AT 5% THD  
WITH 1KHz INPUT INTO THE NORMAL  
CHANNEL AT TP24. ALL NORMAL CHANNEL  
CONTROLS SET TO NORMAL POSITION.  
REVERB AND VIBRATO OFF.

VIBRATO TEST:  
ALL VOLTAGES MEASURED WITH  
SPEED CONTROL AT MAX. (CW),  
AND NO SIGNAL PRESENT.  
APPROXIMATE WAVEFORM AT TP35:



VOLTS	WATTS	TYPE
100V	230V	CP3
50/60Hz	50/60Hz	CP3
CP39	CP7	CP7
CP7	CP39	CP39
CP7	CP34	CP34
CP34	CP36	CP36
CP36	CP4	CP4
CP4	TIE UP	CP4
CP8	TIE UP	CP4
CP8	NC	CP4

- NOTES:
- V1,2,4,5 ARE 12AX7A.
  - RESISTORS IN OHMS, CAPS IN P.F.
  - UNLESS OTHERWISE SPECIFIED.
  - 6-DIGIT NUMBERS ARE FENDER PART NUMBERS.
  - USE 4-φ SLO-BLO IN 100V AND 120V MODELS.
  - (NONE)
  - ALL VOLTAGES MEASURED WITH RESPECT TO GROUND USING A DVM.
  - VOLTAGES MAY VARY ±20% TEST CONDITIONS.
  - LINE VOLTAGE AT 120VAC 60Hz.
  - BRIGHT SWITCHES, REVERB, AND VIBRATO OFF.
  - ALL NORMAL CHANNEL CONTROLS SET TO NORMAL POSITION.
  - DC AS SET TO -52 VDC.
  - ALL VOLTAGES MEASURED WITH AN OSCILLOSCOPE USING A X10 PROBE.
  - INSTANCES NOT USED: C1 C15 C17 C18 C29 C39 C5 C6 C32 C35 R34 R39 R40

**MUSICAL INSTRUMENTS**  
2821 Research Drive  
Concord, CA 91720 USA

TITLE: SCHEMATIC  
CUSTOM VIBRASONIC AMP

SIZE (DRAWN): WILKENS DRAWING NUMBER: 049263 A  
ENG: ZINKY  
SCALE: NONE  
NEXT HIGHER ASSEMBLY: 19-JAN-85

DATE: 1-27-85  
APPROVED: [Signature]

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DATABASE FILE: CSR14.SDF  
CHECKED BY: [Signature]  
DATE: 1-27-85

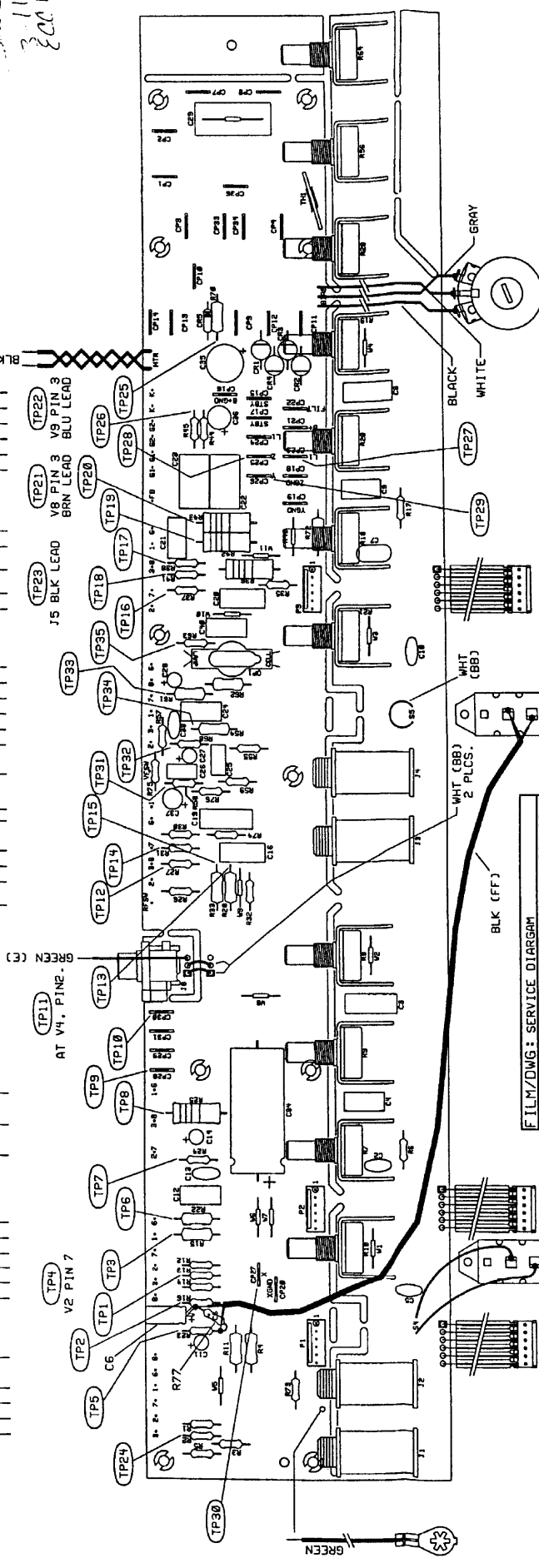
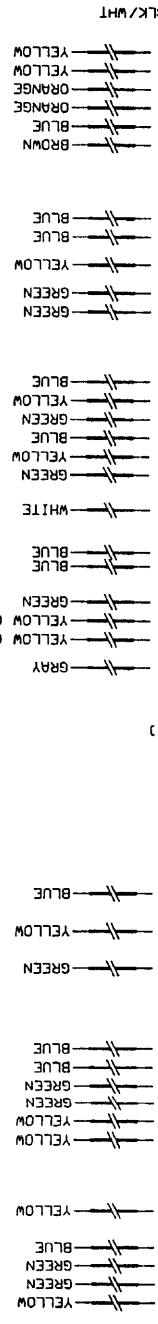
TOLERANCES: ±0.1%  
±0.2%  
±0.5%  
±1.0%  
±2.0%  
±5.0%  
±10%



1 2 3 4 5 6

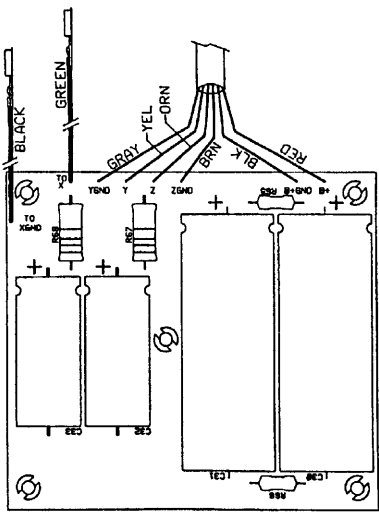
REVISIONS			
ZONE	REV. DESCRIPTION	DATE	APPROVED
	A	RELEASED CSR14	19-JAN-95

3550000  
1192  
200108



FILM/DWG: SERVICE DIAGRAM  
 DATABASE: Z188SER.DBF DATE: 14-JAN-95  
 LAYERS PLOTTED: 1 2 3 4 10 15

CAPACITOR BOARD.



NOTES:  
 1.) PCB SHOWN AS FABRICATED, EXCEPT WITH  
 CAPACITOR BREAK-AWAY BOARD SEPARATED.

**MUSICAL INSTRUMENTS**  
 2621 Research Dr. Ivc  
 Corcoran, CA 91728 USA

**TITLE: SERVICE DIAGRAM**  
**CUSTOM VIBRASONIC AMP**

SIZE: B DRAWN: WILKENS DRAWING NUMBER: 049265 REV. A  
 ENGR: ZINKY  
 [CREATED] 01-NOV-90 [PLOTTED] 14-JAN-95 SHEET 1 OF 1

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**TOLERANCES:** UNLESS OTHERWISE SPECIFIED:  
 X.XX ± 0.01"  
 X.XXX ± 0.005"  
 ANGLES ± 0.5°

**DATABASE FILE:** CSR14SER.DBF  
**CHECKED BY:**  
**DATE:**  
**APPROVED:**  
**DATE:**

**SCALE: NONE**

1 2 3 4 5 6